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AN ANOMALOUS ULNA—SUPRA-CAPITAL FORAMEN

By ALEŠ HRDLIČKA

The bone here described was found by the writer in a burial cave in the Sierra Madre, in Chihuahua, Mexico.¹ This large *cueva de los muertos*, which was made by river action in very ancient time, is situated about four miles southwestward from Guachochic, a place consisting of only a single rancho, the seat of the local *gobernador* of the Tarahumare Indians. It is a long day's journey by muleback to the southwest of the town of Carichic, which latter place is two days' *diligencia* journey west of the city of Chihuahua.

The cave is situated in the picturesque valley of the Arroyo de las Iglesias. It is a very large, widely open cavern, which, when I visited it, contained numberless human bones, both fragmentary and entire, partly covered with stones or earth, partly lying on the surface. A tradition is current that the cave was once full of mummified bodies; but the saltpeter digger came, perhaps also the hunter for buried gold, and, aided by rats and other animals, the mummies were dissociated and the bones strewn about. Then came the superstitious Indian from the neighborhood, who so dreads the harmful *muertos* that he cannot sleep in their neighborhood at night, hearing them singing and dancing, and he threw piles of stones on the bones until they were either broken or buried from sight. These facts have such a bearing on the specimens which I am to describe, that I was unable to obtain any other part of the skeleton to which the anomalous ulna belonged, and therefore cannot say whether the

¹ On the *Lumholtz-Hrdlička Expedition to Mexico under the Auspices of the American Museum of Natural History*; New York, March-July, 1898.



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anomaly was unilateral or bilateral, or what irregularities of structure, if any, were shown by other parts of the skeleton.

The ethnological nature of the bones occurring in the cave mentioned is not yet fully determined. Undoubtedly the burial place is a very old one, for many of the bones, even those which were still buried deeply in the earth and could not have been denuded by animals, do not show even a trace of the dry, tough, mummified tissues which for centuries cling to bones in similar locations. However, the whole surrounding country is, and was, so far as any data or traditions go, occupied by the same tribe of Indians—the Tarahumare—hence in all probability the bones belong to the ancestors of these people.

The ulna here described lay bare on the nitrous earth, and attracted my attention by a peculiar large foramen situated just above its inferior extremity. The bone is apparently that of a male; it shows pronounced curvatures, as do many of the Indian *ulnæ*; it is strong, though not excessively so, and up to its head and neck it is entirely normal.

The carpal extremity of the bone shows the following conditions: The styloid process is short; the articular facet on the head, which is usually more or less semilunar in shape with the concavity toward the styloid process, is in this case irregularly circular, with the lateral width greater than the antero-posterior. A few millimetres below the head is situated a well developed, regular, spacious foramen in the bone. The foramen measures 8 mm. in height by 6 mm. in width; its base and internal side rest on the head and the neck of the ulna, while externally the opening is completed by a span of bone 2 mm. thick and 4 mm. broad in its narrowest part. The bone of the span is entirely normal; the proximal extremity of the bridge is continuous with the shaft of the bone and the interosseous ridge, respectively; while the distal extremity of the bridge, widening considerably, blends imperceptibly with the head of the ulna. There is absolutely no sign of any injury on the lower portion of the ulna.

There are no pronounced indications as to what function the anomalous foramen may have served. The inner walls of the opening are smooth; internally on the shaft there are a low vertical ridge and a parallel shallow depression, as well as numerous small foramina for blood-vessels. The borders of the opening are quite smooth. The surrounding bone shows no trace of any groove or depression.

The interpretation of a large, well developed foramen in such a situation is difficult. Three theories suggest themselves as to its function. The foramen may have served for the transmission of an artery, or a tendon may have passed through it, or it may have lodged some sort of benign growth. No one of these theories is without possible objection. The borders of the foramen are hardly as smooth as they would be had they transmitted some erratic tendon or artery, and outside of its borders there is no trace of any groove such as a large artery or a tendon would produce. As to tumor, there is very little if any excavation or absorption of the walls in the opening, and no thickening of the bone.

The formation must have taken place very early in the life of the individual, as the form of the entire head of the ulna is affected. In all probability the anomaly of the foramen is due to congenital causes.